Indiana Department of Transportation Highway Traffic Noise Policy

Approved by
FHWA, Indiana Division
on October 15, 1997

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The INDOT Highway Traffic Noise Policy was approved by the Federal Highway Administration and went into effect on October 15, 1997.Title 23 of the Code of Federal Regulations Part 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise) requires a highway traffic noise study for the potential impacts of Type I projects that are proposed in areas with noise-sensitive land. The study is to be done according to the FHWA Highway Traffic Noise Prediction Model (Report No. FHWA-RD-77-108), in which the acceptable noise prediction software is FHWA's STAMINA 2.0. Elements of the study include a description of land uses, assessment of before and after noise levels, determination of impacts and a discussion of feasible and reasonable abatement measures if impacts are identified.

INDOT POLICY FOR THE CONSIDERATION OF HIGHWAY TRAFFIC NOISE ON FEDERAL-AID HIGHWAY PROJECTS

SCOPE OF COVERAGE

This policy is meant to implement the requirements of 23 CFR 772 and the noise-related requirements of the National Environmental Policy Act of 1969. The mitigation of highway traffic noise is mandated by the Federal-Aid Highway Act of 1970.

This policy is applicable to Type I projects, which are proposed Federal or Federal-aid highway projects for 1) the construction of a highway on a new location, or 2) the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment (moves 50% closer to receivers) or that increases the number of through-traffic lanes. This policy is not applicable to Type II projects, which are proposed Federal or Federal-aid highway projects for the abatement of noise on existing highways.

THE HIGHWAY TRAFFIC NOISE STUDY

A highway traffic noise study is based on 23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise" as outlined in "Highway Traffic Noise Analysis and Abatement: Policy and Guidance" by FHWA, June 1995. The elements of the study include:

A. Identification of noise-sensitive land uses (receivers) in project area.
B. Determination of existing noise levels.
C. Prediction of future noise levels.
D. Identification of traffic noise impacts.
E. Identification and consideration of abatement.
F. Consideration of construction noise.
G. Coordination with local government officials.

A. Identification of Noise-Sensitive Land Uses (Receivers) to be Studied.

Traffic noise analysis will be done for potential noise encroachments on developed or undeveloped lands and for which development is planned, designed and programmed. The phrase planned, designed and programmed includes land uses which are intended in the future but which are not currently being used at the time of the completion of the project. The land uses shall be identified and categorized into Activity Categories A-E as shown in Table 1.

B. Determination of Existing Noise Levels.

The existing noise level measurements shall yield the worst hourly noise levels occurring on a regular basis under normal traffic conditions. Measurement should be made according to FHWA Report No. FHWA-PD-96-046, Measurement of Highway-Related Noise. If on-site noise meter measurements are not possible, then estimates must be made according to the FHWA Highway Traffic Noise Prediction Model (Report No. FHWA-RD-77-108). Noise is to be measured in units of dBA Leq(h). It is desirable to validate existing noise measurements with the computer model.

C. Prediction of Future Noise Levels.

Predicted noise levels should be obtained according to the FHWA Highway Traffic Noise Prediction Model (Report N. FHWA-RD-77-108). Currently, the STAMINA 2.0 Computer Highway Traffic Noise Program is used. In the near future, the new FHWA Traffic Noise Model (FHWA TNM 1.0) will be used. Input such as volume, speed and truck percentages for modeling should reflect the set of traffic characteristics which yield the worst hourly traffic noise impact on a regular basis under normal conditions.

D. Identification of Traffic Noise Impacts.

Traffic noise impacts occur if either of two conditions are met: 1) the predicted levels approach or exceed the noise abatement criteria (NAC - in Table 1); or, 2) the predicted traffic noise levels substantially exceed the existing noise level.

1) "approach or exceed"

shall mean that future levels are higher than 1 dBA Leq(h) below the appropriate noise abatement criteria (NAC-Table 1). The exterior NAC is to be used in all studies except in cases where no exterior activities are affected by traffic noise. In cases where interior NAC are used, the predictions for interior noise levels can be estimated by subtracting noise reduction from predicted exterior levels using Table 2. The NAC are applicable to the consideration of traffic noise abatement measures, not to the degree of abatement.

2) "substantially exceed"

shall mean when predicted traffic noise levels exceed existing noise levels by 15 dBA or more.

E. Identification and Consideration of Abatement.

If no present or future traffic noise impacts are identified, then the study is complete. When impacts have been identified, there must be consideration of any reasonable and

feasible measures that will abate the traffic noise impacts. Some abatement must be implemented if it is feasible and reasonable on any significant segment of the project.

1) Feasibility of Abatement

"Feasible" means that it is structurally and acoustically possible to attenuate traffic noise occurring at a receiver by at least 5 dBA Leq(h). Traffic noise abatement measures include traffic control measures (TCM), alteration of vertical or horizontal alignment, acquisition of buffering land, noise insulation of impacted receivers, and construction of traffic noise barriers.

2) Reasonableness of Abatement

"Reasonable" means that INDOT believes abatement of traffic noise impacts is prudent based on consideration of all the following factors:

i. The number of benefited receivers, those for whom the mitigation will benefit by at least 5 dBA Leq(h) at the noisiest hour conditions. This number is not necessarily the number of receivers impacted.

ii. The cost of abatement on a benefited receiver basis and on a project level basis. The Indiana Department of Transportation has set the acceptable cost per benefited receiver range as $20,000.00 - $30,000.00. This cost should be arrived at by applying a square footage cost basis on the square footage of the noise barrier. A reasonable square footage cost basis will be determined by the Indiana Department of Transportation.

iii. The severity of existing and future traffic noise levels. The absolute level and the increase of the future noise are two aspects with which to assess the severity of the noise impacts. Figure 1 should be used in consultation.

iv. The timing of development near the project. The state considers it appropriate to give more consideration for development that occurs before initial highway construction.

v. The views of noise impacted residents. Potential negative impacts of noise barriers include unsightliness, shortened daylight, poor air circulation, degradation by weather, reduced safety, vandalism, and restriction of access for emergency vehicles.

F. Consideration of Construction Noise.

Typically, efforts to minimize noise are effected by provisions in the contract that require the contractor to make every effort reasonable to minimize noise by selecting construction methods, work-hour controls, muffler maintenance, selection of haul routes, and enforcement of operations in ways that are considerate of residences such as minimizing tailgate banging and using portable noise shields in selected areas.

Construction noise impacts in areas with large numbers of affected residences can be ameliorated by providing local residents with information on the expected type and duration of construction.

G. Coordination with Local Government Officials.

The coordination of the results of the study with local government officials having jurisdiction over the area to be affected is to be carried out in a timely manner. The purpose of coordination is to promote compatibility between residential land development and the proposed highway project. The following information, specified by 23 CFR 772.15, should be furnished to the local officials in the environmental document:

1) Estimated future noise levels at various distances for developed and undeveloped lands in the immediate vicinity of the proposed highway project.

2) Locations nearby that in the future are susceptible to noise impacts if anticipated projects for existing or proposed highways were to be built.

3) Information on eligibility requirements for Federal-Aid participation in Type II projects.

Table 1. FHWA Noise Abatement Criteria in dBA (hourly A-weighted sound level).

Activity Category	NAC, $L_{eq}(h)$	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches libraries, hospitals, and auditoriums.

NOTE: These sound levels are only to be used to determine impact. These are the absolute levels where abatement must be considered. Noise abatement should be designed to achieve a substantial noise reduction - not the noise abatement criteria.

Table 2. Factors to deduct from exterior noise levels.

Building Type	Window Condition	Exterior of the Structure
All	Open	10 dB
Light Frame	Ordinary Sash (closed)	20 dB
Light Frame	Storm Windows	25 dB
Masonry	Single Glazed	25 dB
Masonry	Double Glazed	35 dB

Figure 1. Impact Criteria for Determining Severity of Noise Impact for the Consideration of Noise Abatement